UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

FINAL DECISION AND RESPONSE TO COMMENTS

W.R. GRACE & COMPANY-CONN.
BALTIMORE, MARYLAND

EPA ID NO. MDD 001710227

September 2014

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I. Introduction

The United States Environmental Protection Agency (EPA) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) selecting the Final Remedy for the W.R. Grace Facility located at 5500 Chemical Road in Baltimore County, Maryland, (hereinafter referred to as the Facility). The Final Decision is issued pursuant to the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901, et seq. EPA's final remedy for the Facility consists of engineering controls consisting of fencing and controlled access, land use controls limiting groundwater use and managing soil exposure, and a monitoring program for groundwater, sediment and pore water.

On July 17, 2014, EPA issued a Statement of Basis (SB) in which EPA proposed a remedy for the Facility. EPA held a thirty (30)-day public comment period which began on July 17, 2014 and ended on August 16, 2014. The only comments EPA received during the public comment period were submitted by the owner of the Facility.

EPA has determined that it is not necessary to make significant modifications to the proposed remedy as set in the SB. Based on comments received during the public comment period EPA is, however, making minor modifications to the SB as described in more detail in Attachment A, EPA Response to Comments. This Final Decision and the remedy selected herein incorporates those minor modifications and clarifications.

II. Facility Background

A. Site History

The Facility is located at 5500 Chemical Road in Baltimore County, Maryland, on approximately 110 acres. It occupies a portion of the southern shoreline of Curtis Bay and the adjacent Sledds Point Peninsula, which separates Curtis Bay to the east from Curtis Creek to the west (Figure 1). The Facility is located in a historically heavily industrialized area that is zoned for industrial use. Adjacent to the Facility to the east is US Gypsum Company and to the south are a cement company, Baltimore City Quarantine Road Landfill, a medical waste treatment facility, and a material recycling facility.

The Facility has been the site of inorganic chemical manufacturing operations since approximately 1909. Prior to that time, the Facility was not in industrial use. The principal product lines manufactured at the Facility through its operating history include sulfuric acid, phosphate fertilizer, amorphous silica gel, zeolites, alumina, and catalyst products. In addition, from May 1956 to early 1957, Grace processed monazite sands to extract thorium and rare earths for the U.S. government.

Grace is currently a manufacturing facility for silica-based absorbents and related products, polyolefin catalysts used in manufacturing of plastics, and fluid cracking catalysts used in petroleum refining. The Facility consists of an approximately 55-acre Manufacturing Area located on a peninsula extending to Sledds Point and a Non-Manufacturing Area of approximately equal size extending along the shoreline east of the Manufacturing Area.

The Manufacturing Area consists of production facilities, warehousing facilities, maintenance shops, and administrative buildings, and historically has been the only portion of the Facility within which manufacturing operations have occurred. The Manufacturing Area also includes a 9-acre parcel referred to as the "former Estech area". This area was formerly used by the Estech General Chemical Company for the manufacture of organic phosphates and chlorinated hydrocarbon pesticides in the 1950s and 1960s. Grace acquired the property in the mid-1970s.

The Non-Manufacturing Area includes six unlined disposal units including Herring Pond, Spoils Pond No. 1, Spoils Pond No. 2, Radioactive Waste Disposal Area (RWDA), a capped landfill, and a historical filter cake disposal cell and one lined unit – the new filter cake disposal cell expansion. Grace uses Herring Pond, the spoils ponds, and the new filter cake disposal cell for the management and disposal of Facility water treatment plant residuals. The RWDA and the capped landfill are inactive units.

The RWDA was placed in the Formerly Utilized Sites Remedial Action Program (FUSRAP). The United States Army Corps of Engineers (USACE) Baltimore District and Grace are jointly conducting FUSRAP remedial actions at the RWDA. The RWDA is excluded from Facility RCRA corrective actions.

The capped landfill was closed in accordance with requirements of the Maryland Department of the Environment (MDE). Evaluation of the conditions of the landfill concluded that there was no need for additional requirements beyond compliance with MDE closure requirements.

B. Site Geology and Hydrogeology

Data from soil borings and monitoring wells collected during the RCRA Facility Investigation (RFI) indicate that the Facility is underlain mainly by fill material, Quaternary lowland estuarine silt and clay deposits, and silty sand deposits belonging to the Patapsco Formation. The fill material consists of poorly-sorted sand and gravel, silt, clay, concrete, brick, wood, and other random debris and ranges in thickness from zero to over 20 feet. The greatest fill thicknesses occur in the ball field area south of Spoils Pond 2 and along the northeastern shoreline and southwestern shorelines of the Manufacturing Area. The fill thickness is highly variable in the Non-Manufacturing Area. Much of the central Manufacturing Area is underlain by fill averaging five feet in thickness.

Underlying the Facility the contact between the Patapsco Formation and the Arundel Clay is approximately 100 feet below ground surface (bgs) and the contact between the Arundel Clay and the Patuxent Formation is approximately 250 feet bgs. The Patapsco Formation is comprised of irregularly distributed beds of sand, gravel, sandy clay, and clay derived mainly from the Piedmont Plateau to the west and northwest. Regionally, the Patapsco is a major water-bearing unit consisting of approximately 30% sand and gravel, but locally it is mostly sand, silty sand, and clay. The Arundel Clay underlies the Patapsco Formation and consists primarily of red to yellow dense, plastic clay with thin lenses of silty clay. Due to its high clay content, Arundel Clay acts as a confining unit for the underlying Patuxent Formation, which is a major water-bearing unit.

The Patuxent and Patapsco aquifers are the two primary sources of groundwater in the vicinity. The Patuxent aquifer is used extensively as a fresh water source in Baltimore and Anne

Arundel counties. However, there are no active withdrawal permits or domestic wells within a one-mile radius of the Facility. In general, the Patapsco aquifer consists of sand and silty sand with discontinuous lenses of gravel, silt, and clay that occur throughout the aquifer without any discernible spatial correlation. In the western half of the Manufacturing Area, a shallow clay unit with a maximum thickness of approximately 30 feet separates the Patapsco aquifer into upper and lower water bearing units. Where present, this clay unit acts as a semi-confining unit that separates a thin zone of shallow groundwater from the deeper portion of the aquifer. Based on differences between the groundwater quality data collected from above and below the Manufacturing Area clay unit, this clay unit forms a semi-confining unit separating the shallow portion of the aquifer from the underlying portion in that area.

Groundwater discharges to either Curtis Bay or Curtis Creek. A local groundwater mound, present in the Manufacturing Area, is centered near the southwestern corner of the Manufacturing Area and may be the result of subsurface leakage from the fire protection system operated by the plant. Groundwater in the Manufacturing Area flows eastward and northeastward toward Herring Pond and Curtis Bay, westward and southwestward toward Curtis Creek, and southward toward groundwater monitoring well GM-23S.

III. Summary of Environmental History

In June 2002, Grace and the EPA entered into an Administrative Order on Consent ("Consent Order"), Docket No. RCRA-03-2002-0063, prepared under Section 3013 of RCRA. Pursuant to Section VI.C of the Consent Order, Grace developed and submitted to EPA a RCRA Facility Investigation (RFI) Workplan (GeoTrans, 2006). The RFI Workplan was approved by EPA, May 11, 2006 and subsequently implemented by Grace, with an RFI Report (GeoTrans, 2008) submitted in May 2008. Grace completed the baseline human health risk assessment (HHRA) and submitted a HHRA Report (Tetra Tech GEO, 2012) in November 2012 to EPA. On December 19, 2012, EPA approved both the RFI Report and the HHRA Report.

Based on subsequent discussions with EPA, Grace developed and submitted to EPA on April 26, 2013 a work plan for focused soil excavation in select areas of the Facility. Following EPA's approval of the work plan on May 6, 2013, Grace completed focused soil excavation activities in December 2013 and January 2014 (Geosyntec, 2014). Based upon the information developed in the RFI, HHRA, and focused soil excavation, Grace prepared and submitted a Corrective Measures Study (CMS) in accordance with EPA Region III's guidance on the Scope of Work for a CMS (Geosyntec, 2014). The CMS presented an evaluation of corrective action alternatives and recommended corrective measures for the Facility. The CMS was approved without comments on June 23, 2014.

A. RCRA Facility Investigations

Extensive data were collected for site-wide characterization of soil, groundwater, sediment, and pore water within the sediment for the development of the RFI. In addition, benthic macroinvertebrates were counted and benthic invertebrate tissues were sampled to support an ecological risk assessment. Soil gas sampling was conducted in the area adjacent to the Former Burn Pit Area (FBPA) to assess potential vapor intrusion of adjacent buildings. One objective of the RFI was to collect characterization data to support the evaluation of human health and/or ecological risk related to the site environmental conditions. For the development of the HHRA, EPA Region 3 Risk-Based Concentrations (RBC) for Residential Soil and residential Regional Screening Levels (rRBC), both with values adjusted for Hazard Index (HI) of 0.1, were used as conservative screening levels.

Manufacturing Area

Soil samples detected with Constituents of Potential Concern (COPC) concentrations above the screening levels were generally distributed across the Facility without recognizable patterns. This observed distribution is indicative of historic placements of fill over broad areas, and to the naturally occurring presence of metals in regional soils. Metals are a principal constituent group detected above screening concentrations in soils. The metals with the most frequent exceedances of screening levels include arsenic, cobalt, iron, chromium (VI), and vanadium. For non-metal COPCs, polycyclic aromatic hydrocarbons (PAHs), particularly benzo(a)pyrene, were the constituents detected with the most frequent exceedances of screening levels. Although COPCs were detected in both surface soil (0 to 3 feet bgs) and subsurface soil (deeper than 3 feet bgs), concentrations detected in the subsurface soil samples were generally lower than those in the surface soil samples.

Overall, the extent of elevated soil concentrations has been delineated and defined laterally by the extent of historic fill and manufacturing activity. For surface soil samples (0 to 3 feet bgs) collected in this area, arsenic concentrations were above the screening level (0.43 mg/kg) in all samples. The maximum arsenic concentration (1,360 mg/kg at location SB-29) was more than three orders of magnitude greater than the screening level. In subsurface soil samples (deeper than 3 feet) collected in this area, arsenic was also the metal COPC with the highest exceedance frequency (number of samples with concentrations above screening level over total number of samples) at 100%. The focused soil excavation, described in III. E, included the removal of soil in the area of SB-29. The maximum arsenic concentration in the subsurface soil samples was 598 mg/kg at location SB-26 (3 to 6 feet bgs). Vanadium and iron were also detected in soil samples collected from this area with high exceedance frequency at 95% and 94%, respectively.

Non-Manufacturing Area

There were 13 metals detected above the screening levels in at least one soil sample collected in the Non-Manufacturing Area. Arsenic was detected with the greatest screening level exceedance frequency (100%) in this area. The maximum detected arsenic concentration was 3,930 mg/kg of a composite sample, TPC-1 collected at 25 ft bgs in the GM-8/SB-25 area. The maximum detected arsenic concentration associated with a discrete soil sample as considered by the HHRA was 532 mg/kg in the surface soil (0 to 1 foot bgs) collected at SB-12. The focused soil excavation, described in III. E, action included the removal of surface soil in the area of SB-12.

Vanadium and iron were also detected in soil samples collected from this area with high exceedance frequency at 100% and 91%, respectively.

B. Sediment and Pore Water

For the sediment evaluation, seven off-shore sampling stations and three reference sampling stations located at Ferry Point across Curtis Creek were established. All bulk sediment samples were enumerated for benthic macroinvertebrates and analyzed for metals, SVOCs, total organic carbon (TOC), and grain size. In addition, sediment pore water samples were collected from all locations and analyzed for dissolved metals. Constituent of Interest (COI) concentrations detected in bulk sediment samples were compared to the following:

The EPA Biological Technical Assistance Group Sediment Quality Guidelines (SQGs) for Region III; The Effects Range Median Sediment Quality Guidelines (originally published by National Oceanic and Atmospheric Administration and cited in MacDonald et al., 2000); and The "consensus-based" Probable Effect Concentration guidelines published by MacDonald et al. (2000).

The sediment sampling data were similar between Facility-related sediment sampling locations and the Reference locations, with some concentrations in both data sets above conservative sediment quality screening levels. The dissolved metal concentrations detected in pore water samples were compared to the ambient water quality criteria for chronic saltwater aquatic life. Most metals were below their respective ambient water quality criteria at most locations. The sediment analyses indicated that most of the benthic substrates were composed mainly of sand and fine silt, along with a small amount of gravel. Three major groups of marine invertebrates were detected: Polychaeta, Mollusca, and Crustacea. Based on analyses of various metrics of benthic community health and considering other data, the RFI concluded that the sediment adjacent to the Facility is similar in quality and supports equally healthy benthic communities as the off-site Reference locations. Therefore EPA concluded that there appears to be little to no apparent effect on the benthic community associated with COI concentrations detected in bulk sediments and pore water.

C. Groundwater

The lateral and vertical extent of groundwater was delineated during the RFI by screening monitoring well concentrations against residential Regional Tapwater Screening Levels. Based on the RFI data, no localized, discernible source area or plume is present at the Facility. Groundwater was characterized by metals detections above screening levels; arsenic is the primary groundwater COPC considering the detection frequency and degree by which the concentrations are above the screening level. For organic COPCs, concentrations greater than screening levels were sporadic in occurrence with the exception of the FBPA. Groundwater samples collected from monitoring well locations GM-31, GM-27S, and GP-18 at the northwest end of the Manufacturing Area contain the greatest number of exceedances. Based on the COPC screening results, the maximum arsenic concentration detected in a site monitoring well was 11,700 μg/L at P-9S, southwest of Herring Pond.

Two groundwater monitoring wells (GM-33S and GM-33D) are located within the FBPA. Fourteen metals were detected in groundwater samples collected in the FBPA at concentrations above their respective screening levels in one or more samples; however, VOCs and SVOCs were the primary COPCs in the FBPA groundwater. Forty-four non-metal COI were detected in the groundwater samples collected from FBPA at concentrations above their respective screening levels. Among these, 21 were VOCs, 18 were SVOCs, three were Aroclors, and two were pesticides. The sample collected from GM-33S was characterized by the greatest number of exceedances at 19. As with VOCs, the sample collected from GM-33S was detected with the greatest number of SVOC exceedances at 11.

Perimeter groundwater monitoring was performed at Grace in August 2006 and March 2007 and annually from February 2008 through February 2013. The monitoring wells included in the annual groundwater monitoring program were select wells located along the shoreline perimeter. The scope of annual monitoring (wells sampled and chemical constituents analyzed) was consistent with the Facility Quality Assurance Project Plan (QAPP) as amended by the following:

EPA's letter dated 4 January 2008 (Subject: Proposed Modifications to the Groundwater Sampling Task [Geo Trans, Inc., 8/17/07] W.R. Grace & Co. – Conn., Baltimore, Maryland); and EPA's letter dated 11 January 2011 (Subject: Proposed Modifications to the Groundwater Sampling Task [Geo Trans, Inc., Response to Request for Additional Information, 1/6/11]).

Results of each annual groundwater monitoring event were submitted to EPA. Between 2008 and 2013, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury nickel, vanadium, and zinc were detected at concentrations above their screening levels at least once. Each year, arsenic was the metal with the highest exceedance frequency, which was greater than 55%. During the most recent sampling event (February 2013), the maximum arsenic concentration was detected at location GM-28 (3,000 µg/L). Overall the magnitude and the number of arsenic exceedances have declined since 2008. The maximum concentration of arsenic decreased from 12,400 µg/L (GM-33D) in 2008 to 3,000 µg/L at GM-28 in 2013. The exceedance frequency of arsenic also decreased from 79% of the wells in 2008 to 56% in 2013. A similar observation was made for lead, with the maximum concentration of 1,240 µg/L at GM-33S in 2008 and 530 µg/L at GM-28 in 2013, and an exceedance frequency of 29% in 2008 and 17% in 2013.

Of the 52 VOCs included in the monitoring program, three VOCs [methylene chloride, perchloroethene (PCE), and trichloroethene (TCE)] were detected at concentrations above their screening levels each year since 2008. In addition, 15 VOCs were detected at concentrations above screening levels at least once between 2008 and 2013. During the February 2013 sampling event, one monitoring well (P-7D located to the north of Herring Pond) detected VOC concentrations above screening levels, including 1,2-dichloroethane, benzene, chloroform, methylene chloride, PCE, and TCE. Between 2008 and 2013, four SVOCs [2-Methylnaphthalene, bis(2-Chloroethyl) ether, Naphthalene, and Phenanthrene] were detected at concentrations above their screening levels every year at one or more sampling locations. Among these four SVOCs, bis(2-Chloroethyl) ether was the compound with the highest exceedance frequency ($\geq$ 44%) in more than one sampling event. The maximum concentration of bis(2-Chloroethyl) ether detected in the February 2013 sampling event was 0.5 µg/L at P-7D.

D. Risk Assessment

A baseline HHRA was completed, and the HHRA Report (Tetra Tech, 2012) was submitted to and subsequently approved by EPA. In addition, an addendum (ARCADIS, 2011) to the RFI Report presenting the results of an evaluation of potential ecological risks associated with arsenic and lead in sediments was also approved by EPA. EPA conducted an assessment of potential ecological risk associated with uplands areas. For the development of the HHRA, a conservative screening process was established and used to screen the RFI data and identify the COI that could potentially present a credible and quantifiable risk to human health. The screening process was specific with respect to potential receptors, individual routes of potential exposure, and exposure scenarios that were first established and approved by EPA as the basis for the HHRA. The screening resulted in the identification of a total of 53 soil COPCs and 74 groundwater COPCs. The HHRA applied distinct exposure scenarios related to the surface soil (0 to 3 feet bgs) and the subsurface soil and groundwater (3 to 10 feet bgs).

Out of six exposure scenarios evaluated, the only one resulting in acceptable risk and hazard estimates was the adolescent trespasser for the Non-Manufacturing Area. All of the other scenarios resulted in either unacceptable risk estimates ranging from 2.4E-4 to 4.8E-4, and/or unacceptable hazard indices ranging from 1.6 to 99.6. The largest contributor to Reasonable Maximum Exposure risk was arsenic with approximately 50% of the cancer risk and approximately 62% of the Hazard Index (HI). The major contribution for arsenic was from incidental soil ingestion. After completing the RFI and the risk assessments, a focused soil excavation, approved by EPA May 6, 2013, was performed to remove soils from select areas where elevated concentrations of arsenic, VOCs or SVOCs were detected (Section III. E). The soil removal was performed at four discrete areas, including the FBPA and the areas surrounding soil boring locations SB-28, SB-29, and SB-12. The soil excavation, disposal, and backfill activities were completed in December 2013 and January 2014 (Geosyntec, 2014). The soil removal action resulted in revised exposure point concentrations and revised risk assessment calculations, yielding calculated risk and HI within EPA's acceptable range for the current use of the Facility.

E. Focused Soil Excavation

The four excavation areas were selected based on data presented in the RFI Report (GeoTrans, 2008) and findings of the HHRA (Tetra Tech GEO, 2012), which indicated that (i) elevated concentrations of select VOCs and metals were present in the FBPA; and (ii) elevated concentrations of arsenic were present at SB-28, SB-29, and SB-12. The extent of excavation in the FBPA generally followed the extent of fill area characterized during the RFI. Excavation in the FBPA was to the groundwater table, in this area of the Facility, approximately 5 to 8 feet bgs. For each of the excavations in the vicinity of SB-28, SB-29 and SB-12, the excavation was to a depth of 3 feet bgs. Soil was excavated from target areas and disposed of off-site in accordance with the Soil Management Plan included in the approved work plan. The excavations were subsequently backfilled with pre-approved clean imported soil.

F. Ecological Risk Assessment

The assessment of risk to ecological receptors included consideration of the potential risk posed to terrestrial receptors, intertidal zone receptors, and receptors that inhabit the subtidal groundwater/surface water transition zone.

With regard to the assessment of risks to terrestrial receptors, EPA conducted a visit on July 27, 2005. Based on the results of this visit, EPA concluded that the ecological exposure pathways for the impacted terrestrial habitat of the Facility are either incomplete or do not pose an unacceptable risk (EPA, 2007).

The results obtained from the RFI sediment sampling, sediment pore water sampling, and benthic enumeration characterization provided data to characterize risks posed by the Grace Facility to the subtidal groundwater/surface water transition zone in the adjoining surface water bodies. The data suggest that Facility COIs in the sediment are not affecting the benthic community in a measurable way. Concentrations of COIs measured in pore water and sediment are generally comparable to reference area samples. Additionally, metrics of benthic population health are comparable between Facility sample locations and reference locations.

An evaluation of the potential risks to upper trophic level receptors from exposure to arsenic and lead in sediments in the vicinity of the Facility was conducted as part of the RFI. The evaluation was complemented by a potential food chain risk evaluation. Collectively the evaluations concluded that there was likely no potential risk to mammals or birds resulting from the observed levels of arsenic and lead in bulk sediments or pore water near the Facility.

IV. Corrective Action Objectives

EPA has identified the following Corrective Action Objectives (CAO) for soils and groundwater at the Facility:

A. Soils

EPA has determined, that based on the facility specific risk assessment, that direct contact with soils do not pose an unacceptable risk for current industrial exposure scenarios for the entire Facility. However, surface and subsurface soils pose an unacceptable risk to hypothetical future construction workers and hypothetical future industrial workers for the entire Facility. Therefore EPA's CAO for Facility soils is to control exposure to the hazardous constituents remaining in the soils over the Facility specific risk assessment exposure point concentrations by requiring the compliance with and maintenance of land use restrictions and the implementation of engineering controls and a soil management plan.

B. Groundwater and Technical Impracticability

EPA expects final remedies to return usable groundwater to its maximum beneficial use, where practicable, within a timeframe that is reasonable. Where returning contaminated groundwater to its maximum beneficial use is not technically practicable, EPA generally expects facilities to prevent or minimize the further migration of a plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction. Technical impracticability (TI) for contaminated groundwater refers to a situation where achieving groundwater cleanup standards associated with final cleanup standards is not practicable from an engineering perspective. The term "engineering perspective" refers to factors such as feasibility, reliability, scale or magnitude of a project, and safety.

EPA has determined that restoration of groundwater to drinking water standards known as Maximum Contaminant Levels (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1 at the Facility is technically impracticable for the following reasons:

1) COPCs (primarily arsenic) greater than screening levels are sporadic in occurrence;
2) Elevated COPC concentrations are present across the Facility as a result of historical practices for utilizing fill and are located in both soil and groundwater, without a localized, discernible source area;
3) There are no currently available remedial technologies capable of permanently restoring the groundwater to MCLs; and
4) Excavation (removal) of the fill is not feasible from an engineering or cost perspective given the areal extent and depth of the fill and the presence of manufacturing operations.

Therefore, EPA's Corrective Action Objectives for Facility groundwater are to control exposure to the hazardous constituents remaining in the groundwater and ensure that groundwater containing elevated concentrations of COPCs will not impact ecological receptors nor adjacent surface water bodies.

V. Final Remedy

The final remedy for the Facility consists of:

1) Establishment of a TI zone for groundwater with long term monitoring; and

2) Land and groundwater use restrictions.

A. Groundwater – Establishment of a TI Zone with Long Term Monitoring

Because of the constraints of no discernible plume of contamination and the particular hydrogeological conditions at the Facility, i.e., site-wide fill prohibiting source removal, EPA is proposing ongoing groundwater monitoring combined with groundwater use restrictions, sediment and pore water monitoring, along with the establishment of a TI Zone as the remedy that represents the best balance of the criteria that EPA considers when selecting a remedy. This remedy will be protective of human health and the environment. In addition, natural attenuation will continue to mitigate groundwater impacts to adjacent surface water bodies.

B. Land and Groundwater Use Restrictions

Because COPCs remain in the soil and groundwater at the Facility at levels that may result in risks of adverse health effects to hypothetical future construction workers above EPA's target risk levels, EPA's final remedy requires land and groundwater use restrictions for activities that may result in exposure to those contaminants.

EPA is proposing the following land and groundwater use restrictions be implemented at the Facility:

a) All intrusive earth moving activities at the Facility, including excavation, drilling and construction activities, shall be conducted in compliance with the Facility-specific health and safety protocols and an EPA-approved Soil Management Plan (that includes appropriate Personal Protective Equipment requirements sufficient to meet EPA's acceptable risk and complies with all applicable OSHA requirements);
b) Access restriction through the use and maintenance of fencing and controlled access (security gate);
c) Groundwater at the Facility shall not be used for any purpose, including, but not limited to, use as a potable water source, other than to conduct the maintenance and monitoring activities required by EPA or other governmental parties; and
d) The Facility shall not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy.

The land and groundwater use restrictions necessary to prevent human exposure to contaminants at the Facility will be implemented through an order and/or an Environmental Covenant pursuant to the Maryland Environmental Covenant Act (Maryland Environment Code Annotated § 1-800). If EPA determines that additional maintenance and monitoring activities, land use controls, or other corrective actions are necessary to protect human health or the environment, EPA has the authority to require and enforce such additional corrective actions through an enforceable mechanism which may include an order or Environmental Covenant, provided any necessary public participation requirements are met.

VI. Evaluation of Final Remedy

This section provides a description of the criteria EPA used to evaluate the final remedy consistent with EPA guidance, "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule," 61 Federal Register 19431, May 1, 1996. The criteria are applied in two phases. In the first phase, EPA evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria to determine which remedy alternative provides the best relative combination of attributes.

A. Threshold Criteria

1. <u>Protect Human Health and the Environment</u> - This criterion is met without additional remedial actions with respect to current risk except for potential current construction workers. Implementation of the use restrictions will address the residual risk and will also protect hypothetical and future workers by eliminating or controlling potential exposure pathways, thus, reducing potential intake and contact of soil and groundwater COPCs by human receptors. The ecological risk assessment concluded that the Facility currently does not pose an unacceptable risk to the environment. The Facility will verify that current conditions remain the same by conducting ecological monitoring.

2. <u>Achieve Media Cleanup Objectives</u> - EPA's final remedy meets the cleanup objectives appropriate for the expected current and reasonably anticipated future land use, which are risk-reduction. The objectives are to protect workers (hypothetical future construction worker) from potential exposures to Facility-related soil or groundwater constituents at levels that may result in risks of adverse health effects. Given the controlled access and use restrictions described in Section V.B, the final remedy will attain soil and groundwater objectives. Groundwater is not used for potable purposes within one mile of the Facility. The final remedy does not meet groundwater cleanup standards that would allow for the beneficial use of groundwater at the Facility. Because EPA has determined that achieving groundwater MCLs is technically impracticable, concentration specific cleanup goals for groundwater were not developed. The activity use restrictions will eliminate current and future unacceptable exposures to both soil and groundwater.

3. <u>Control the Source of Releases</u> - In its RCRA Corrective Action remedies, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Controlling the sources of contamination relates to the ability of the remedy to reduce or eliminate, to the maximum extent practicable, further releases. Subsequent to the completion of the focused soil excavation, sampling results did not indicate localized, discernible source areas associated with the soil and groundwater conditions observed at the Facility. The results of both perimeter groundwater monitoring and sediment and porewater sampling did not indicate material effects of COPCs to the environment. The soil excavation has removed select soil COPCs in four areas reducing potential risks to within risk levels for current industrial workers. The control measures included in the final remedy, such as Soil Management Plan requirements and groundwater use restrictions, provide a mechanism to control and reduce potential further releases of COPCs by eliminating the potential for groundwater use and requiring proper planning associated with intrusive activities.

B. Balancing/Evaluation Criteria

1. **Long-Term Reliability and Effectiveness** - The final remedy will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater. The long term effectiveness is high, as use restrictions are readily implementable and easily maintained. Given the historical, heavily industrial uses of the Facility and the surrounding area, including the presence of landfills, industrial land uses of this area and existing groundwater use restrictions are expected to continue in the long term.

2. **Reduction of Toxicity, Mobility, or Volume of Waste** - The completion of the focused soil excavation in select areas has reduced toxicity, mobility, and the volume of soil COPCs. The final remedy will not actively further reduce the toxicity, mobility, or volume of the soil COPCs. Groundwater COPCs have generally demonstrated a stable or decreasing trend in concentrations with time and this trend is likely to continue. The final remedy will avoid the short term risks associated with excavating and transporting large quantities of soil.

3. **Short-Term Effectiveness** - EPA's final remedy does not involve any additional activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. The Facility is located in a heavily industrial zone, which is not densely populated, and the nature of contamination does not pose a fire or explosion hazard. There are existing control measures in place, including groundwater use restrictions and Facility-specific health and safety protocols and Soil Management Plan, which have been shown to be effective in protecting workers; therefore the final remedy's short-term effectiveness is high.

4. **Implementability** - **EPA's** final remedy is readily implementable. The remedy will be implemented using existing monitoring wells. The final remedy is easily implemented because Grace owns and operates the Facility. Some of the control measures included in the final remedy, including State groundwater use restrictions where public water supply is available and Facility-specific health and safety protocols and Soil Management Plan are already in place. The control measures are compatible with current Facility uses and operations, and can be implemented, maintained, and monitored effectively with a well-designed control plan.

5. **Cost** - The major cost components for the final remedy include the implementation of a monitoring and reporting program, and maintenance of existing control programs. Grace will develop a cost estimate for the EPA-approved corrective measures for the Facility as part of the design for Corrective Measures Implementation and to provide a basis for demonstrating financial assurance compliance. Based on EPA's best professional judgment, the final remedy is cost effective for the Facility.

6. **Community Acceptance** - Grace is a founding member of, and meets regularly with, the South Baltimore Community Advisory Panel to foster open dialogue with the community. There have been no known issues raised by the community regarding RCRA investigation efforts.

7. **State/Support Agency Acceptance** - MDE has been involved throughout the Facility investigation process. The use restrictions included in the final remedy are already in place and are generally recognized as commonly employed measures for long-term stewardship.

VII. Environmental Indicators

Under the Government Performance and Results Act (GPRA), EPA has set national goals to address RCRA corrective action facilities. Under GPRA, EPA evaluates two key environmental clean-up indicators for each facility: (1) Current Human Exposures Under Control and (2) Migration of Contaminated Groundwater Under Control. The Facility met these indicators on September 1, 2004, and July 12, 2005, respectively. The environmental indicators are available at http://www.epa.gov/reg3wcmd/ca/md/webpages/mdd001710227.html.

VIII. Financial Assurance

W.R. Grace will be required to demonstrate and maintain financial assurance for completion of the remedy pursuant to the standards contained in Federal regulations 40 C.F.R. § 264.145 and 40 C.F.R. § 264.143.

IX. DECLARATION

Based on the Administrative Record, EPA has determined that the Remedy as set forth in this Final Decision is appropriate and will be protective of human health and the environment.

Signature: Date: 9.4.14

John Armstead, Director
Land and Chemicals Division
USEPA, Region III

Attachment 1 Administrative Record File Index of Documents
Attachment 2 EPA Response to Comments
Attachment 3 Grace's comments on the Statement of Basis
Figure 1 Facility Location Map
Figure 2 Facility Map
Figure 3 Monitoring Well Location Map

ATTACHMENT 1

W.R. GRACE & CO. – CONN.
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INDEX OF DOCUMENTS

1. Letter from Diane Aijl, EPA, to Lidia Duff, W.R. Grace & Co. – Conn. Davison Chemical Division Curtis Bay Works, dated 6 June 2002, transmitting Administrative Order on Consent.

2. EPA, 2007. Terrestrial Habitat and Soil Contaminants at W.R. Grace Curtis Bay Works. November 20, 2007 Memorandum from Stephanie Dehnhard (EPA) to Paul Bucens (Remedium Group).

3. Letter from Erich Weissbart, EPA, to Paul Bucens, W.R. Grace & Co. – Conn., dated 23 June 2014, approving Facility-wide CMS.

4. Letter from Paul Bucens, W.R. Grace, to Erich Weissbart, USEPA, dated 21 May 2012, containing Analysis Results for the February 2011 Groundwater Sampling Round Conducted for the W. R. Grace & Co. – Conn. Curtis Bay Works RCRA Facility Investigation, May 27, 2011.

5. Electronic Communication from Mark Shupe, Geotrans, to Stephanie Denhard, USEPA, dated 30 May 2008, containing Analytical Results for the February 2008 Groundwater Sampling Round Conducted for the W. R. Grace & Co. – Conn. Curtis Bay Works RFI.

6. Electronic Communication from Mark Shupe, Geotrans, to Stephanie Denhard, USEPA, dated 28 May 2009, containing Analytical Results for the February 2009 Groundwater Sampling Round Conducted for the W. R. Grace & Co. – Conn. Curtis Bay Works RFI.

7. Electronic Communication from Mark Shupe, Geotrans, to Bill Wentworth, USEPA, dated 18 May 2010, containing Analytical Results for the February 2010 Groundwater Sampling Round Conducted for the W. R. Grace & Co. – Conn. Curtis Bay Works RFI.

8. ARCADIS, 2011. Revised Evaluation of Potential Food Chain Risks Associated with Arsenic and Lead in Sediments, Revised Addendum to the RCRA Facility Investigation Report, W.R. Grace & Co.-Conn. Curtis Bay Works Site, Baltimore, Maryland, March 2011.

9. Geosyntec Consultants, Inc. (Geosyntec), 2013. Voluntary Focused Soil Excavation Work Plan, Curtis Bay Works, Baltimore, Maryland, April 2013.

10. Geosyntec Consultants, Inc. (Geosyntec), 2014. Voluntary Focused Soil Excavation Field Notes and Contractor Submittals.

11. GeoTrans, 2002. Final Historical Data Review and Report of Groundwater Investigations to Support Environmental Indicator Determination for the W. R. Grace & Co. - Conn.,

Davison Chemical Division, Curtis Bay Works, Baltimore, Maryland. Prepared for W.R. Grace & Co.-Conn., February, 2002.

12. GeoTrans, 2003. Quality Assurance Project Plan for the RCRA Corrective Action Program at the W.R. Grace & Co. – Conn, Davison Chemical Division, Curtis Bay Works, Baltimore, Maryland, May 30, 2003.

13. GeoTrans, 2006. RCRA Facility Investigation Work Plan, Curtis Bay Works, W.R. Grace & Co. – Conn., Baltimore, Maryland Quality Assurance Project Plan.

14. GeoTrans, 2008. RCRA Facility Investigation Report for the W.R. Grace & Co.-Conn. Curtis Bay Works, Baltimore, Maryland, May 2008.

15. Tetra Tech GEO, 2011. Results of the Soil Gas Investigation in the Vicinity of the Former Burn Pit Area for the W.R. Grace & Co.-Conn. Curtis Bay Works, May 2011.

16. Tetra Tech GEO, 2012. Human Health Risk Assessment Report for the W.R. Grace & Co.-Conn. Curtis Bay Works, November 2012.

17. Geosyntec 2014 – Corrective Measures Study, Curtis Bay Works, Baltimore, Maryland, February 27, 2014.

ATTACHMENT 2

W.R. GRACE & CO. – CONN.
BALTIMORE, MARYLAND
EPA RESPONSE TO COMMENTS

During the comment period, EPA received comments from Paul Bucens of Grace on the Statement of Basis. Grace's comments and EPA's responses to those comments are set forth below.

Page 4 Section III 2nd Paragraph 3rd from Last Sentence
Suggest that a reference is added for the CMS at the end of this sentence (i.e. Scope of Work for a CMS (Geosyntec, 2014)" and that the reference is included in the administrative record index at page 15.

EPA's Response
EPA agrees and will make the change.

Page 5 Manufacturing Area, 2nd Paragraph
Please add "The focused soil excavation, described in III.E., included the removal of soil in the area of SB-29." Immediately before the sentence that begins "The maximum arsenic concentration in the subsurface soil…" This will eliminate the impression that the SB-29 soil remains onsite.

EPA's Response
EPA agrees and will make the change.

Page 5 Manufacturing Area, 2nd Paragraph
Please revise the last sentence to read "The focused soil excavation, described in III.E., included the removal of surface soil in the area of SB-12." This will enable ease of cross reference and consistency in terminology.

EPA's Response
EPA agrees and will make the change.

Page 7, 1st Paragraph, 1st Sentence
Please revise to read "Perimeter groundwater monitoring was performed at Grace in August 2006 and March 2007 and annually from February 2008 through February 2013." in order to include the two rounds of sampling performed on a semi-annual basis.

EPA's Response
EPA agrees and will make the change.

Page 7, 3rd Paragraph, 1st and 2nd Sentences
Please correct the two grammatical errors so the sentence reads "Results of each annual groundwater monitoring event were submitted to EPA. Between 2008 and 2013, arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury; nickel, vanadium, and zinc were detected at concentrations above their screening levels at least once."

EPA's Response
EPA agrees and will make the change.

Page 8, Section III.E.
Please revise the title to "Focused Soil Excavation" as this work was not performed as an Interim Measure as defined in the 2002 Consent Order.

EPA's Response
EPA agrees and will make the change.

Page 8, Section III.F., 3rd Paragraph, 2nd Sentence
Please revise the sentence to read "The data suggest that the Facility COIs in sediment are not affecting the benthic community in a measurable way." Whether the constituents are present as a result of historic transport from the site, ongoing transport from the site or other sources is not defined. Further the overall quality of the sediment was assessed during the RFI, not just the effects of the "principal constituents".

EPA's Response
EPA agrees and will make the change.

Page 9, Section IV.A. 2nd Sentence
Please revise the sentence to read "However, surface and subsurface soils pose an unacceptable risk to hypothetical future construction workers and hypothetical future industrial workers for the entire Facility". Similarly at Page 11, Section VI.A.1, the "and" should be removed from between "hypothetical" and "future". This will ensure consistency with the risk assessment and references elsewhere in the Corrective Measures Study and this Statement of Basis.

EPA's Response
EPA agrees and will make the change.

Page 9, Section IV.B., Bullet 4)
Please revise the bullet to read "Excavation (removal) of the fill is not feasible from an engineering or cost perspective given the areal extent and depth of the fill and the presence of manufacturing operations."

EPA's Response
EPA agrees and will make the change.

Page 10, Section V.B., 1st Paragraph
Please revise to read "Because COPCs remain in the soil and groundwater at the Facility at levels that may result in risks of adverse health effects to hypothetical future construction workers above EPA's target risk levels, EPA's proposed remedy requires land and groundwater use restrictions for activities that may result in exposure to those contaminants." This has been slightly reordered to improve clarity of the text.

EPA's Response
EPA agrees and will make the change.

Page 10, Section V.B., Bullet a)
Please insert "intrusive" after "All". This clarifies that soil management applies to disturbance of in place soil rather than import and placement of clean fill and is consistent with VI.A.3 (remedy evaluation).

EPA's Response
EPA agrees and will make the change.

Page 10, Section V.B., Bullet c)
Please insert "or other governmental parties (i.e. groundwater well monitoring associated with the MDE landfill permit)" after "required by EPA". This clarifies that other activities on site, such as MDE required monitoring, remediation or construction work may require groundwater "use" such as sampling or extraction for safe and efficient excavation dewatering.

EPA's Response
EPA agrees and will make the change.

Page 11, Section VI.A.1., Last Sentence
Please revise the text to "The Facility will verify that current conditions remain the same by conducting ecological monitoring." "Verify" is suggested in place of "ensure" as the monitoring will only provide data.

EPA's Response
EPA agrees and will make the change.

ATTACHMENT 3

GRACE

Paul G. Bucens
Project Manager
Environment, Health and Safety

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M +1 617.899.0354
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W. R. Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

August 12, 2014

Mr. Erich Weissbart
U.S. Environmental Protection Agency – Region III
Land and Chemicals Division
Environmental Science Center
701 Mapes Road
Fort Meade, MD 20755

RE: Grace Comments on Statement of Basis dated July 2014
W.R. Grace & Co.-Conn., Grace Davison Curtis Bay Works, Baltimore, MD
Administrative Order on Consent
U.S. EPA Docket No. RCRA-03-2002-0063

Dear Mr. Weissbart:

Grace has received and reviewed the referenced Statement of Basis issued by U.S. EPA for public comment. The following provides Grace's comments:

Page 4, Section III, 2nd Paragraph, 3rd from Last Sentence
Suggest that a reference is added for the CMS at the end of this sentence (i.e. "... Scope of Work for a CMS (Geosyntec, 2014)" and that the reference is included in the administrative record index at page 15.

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Page 11, Section VI.A.1., Last Sentence
Please revise the text to "The Facility will verify that current conditions remain the same by conducting ecological monitoring." "Verify" is suggested in place of "ensure" as the monitoring will only provide data.

Please do not hesitate to call (617 498 2667) or e-mail (paul.g.bucens@grace.com) me if you have any questions related to this project.

Sincerely,

Paul Bucens, P.E.
Project Manager

cc: K. Krammer, Grace Curtis Bay Works
L. Duff, Grace Legal
J. Wang, Geosyntec
E. Hammerberg, MDE

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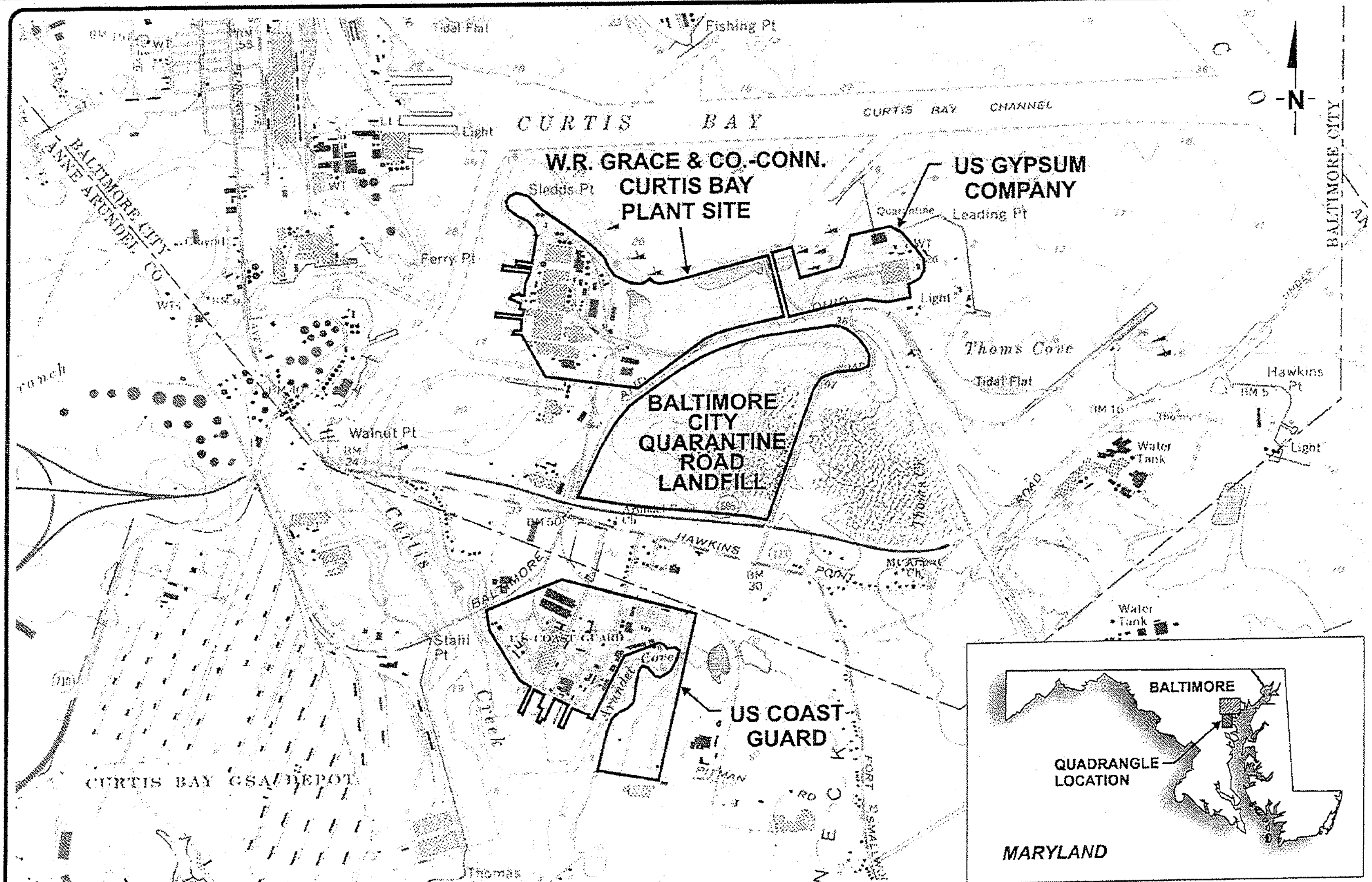
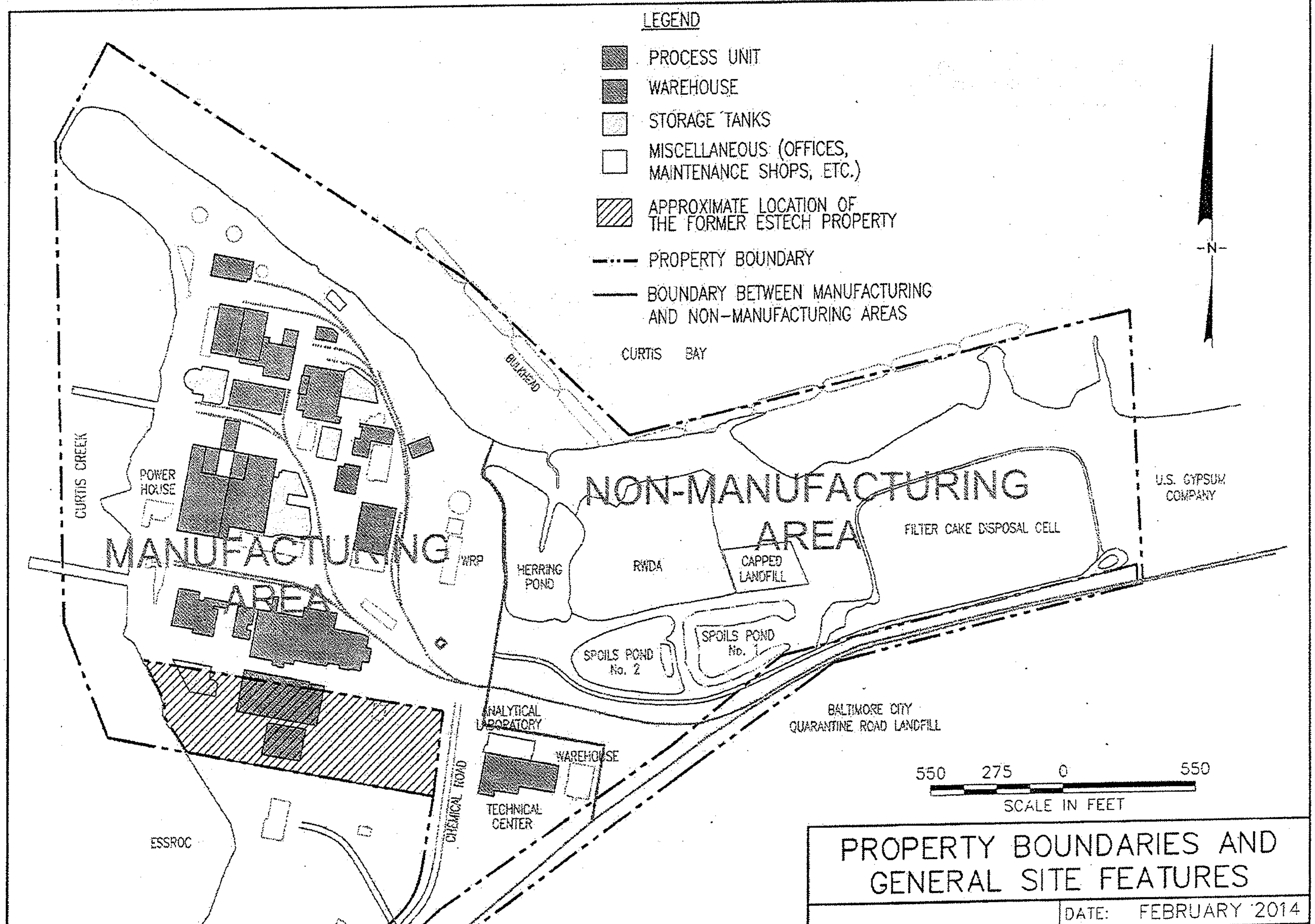


(*SOURCE:* USGS 7.5 MINUTE QUADRANGLE: CURTIS BAY, MD., 1969, PHOTOREVISED 1974)

Figure 2.1. Location of the Curtis Bay Plant Site and Major Facilities in the Plant Site Vicinity.

GeoTrans, Inc.
A TETRA TECH COMPANY



SOURCE: RFI REPORT (GeoTrans, 2008). MINOR CHANGES MAY HAVE OCCURRED.

PROPERTY BOUNDARIES AND GENERAL SITE FEATURES	
Geosyntec consultants COLUMBIA, MARYLAND	DATE: FEBRUARY 2014 PROJECT NO. BR0220 DOCUMENT NO. FILE NO. 0220-321 FIGURE NO. 2.1

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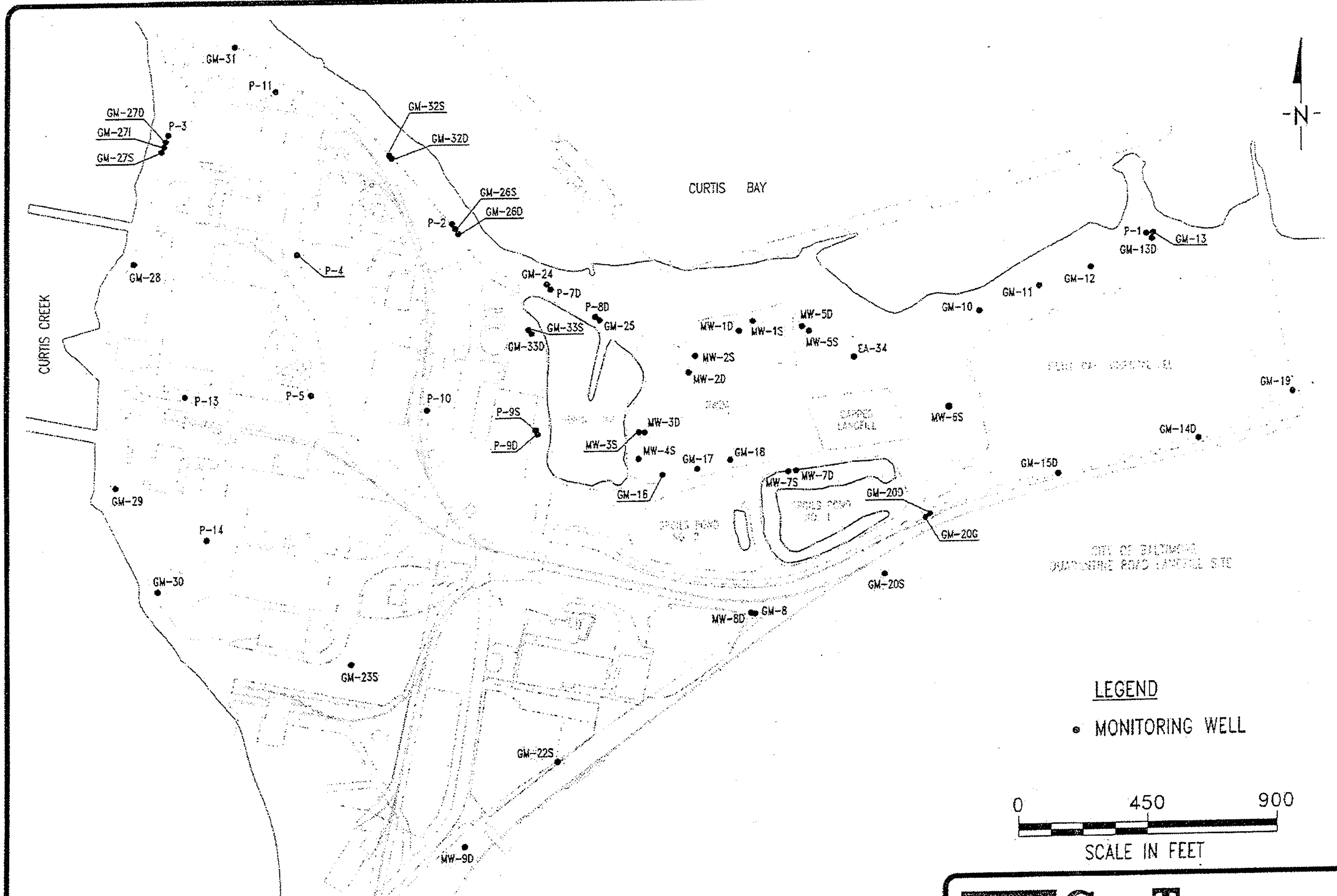

Figure 2.10. Locations of Monitoring Wells at the Curtis Bay Site.